Title: Creating Your Dream Home

Brief Overview:

This activity is designed to allow students to apply real-life information to create their dream home within a budget. Students will use area formulas and mathematical calculations to put flooring, paint, and/or wallpaper in their homes. The final product will then be communicated to their classmates and teacher.

NCTM 2000 Principles for School Mathematics:

- **Equity:** *Excellence in mathematics education requires equity - high expectations and strong support for all students.*
- **Curriculum:** *A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades.*
- **Teaching:** *Effective mathematics teaching requires understanding what students know and need to learn and then challenging and supporting them to learn it well.*
- **Learning:** *Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge.*
- **Assessment:** *Assessment should support the learning of important mathematics and furnish useful information to both teachers and students.*
- **Technology:** *Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning.*

Links to NCTM 2000 Standards:

- **Content Standards**

Number and Operations

Students will demonstrate their ability to use a budget sheet to determine the cost of flooring, wallpaper, and paint for their dream home. They also will apply ratios to calculate costs per square foot.

Geometry

Students will use proportions and rates to solve problems. They also will use graph paper to make a scale drawing of their dream home and build a three - dimensional model of their home.

Measurement

Students will be selecting units to accurately measure room size and using formulas to determine the area of the rooms.

Data Analysis and Probability

Students will collect and analyze data for flooring, wallpaper, and paint in their homes.

- **Process Standards**

  <u>Communication</u>
  Students will communicate their thoughts orally and in written form as to why this is their dream home and present this to their peers and teacher.

  <u>Connections</u>
  Students will use knowledge of area and apply it to a real-life situation with a home.

  <u>Representation</u>
  Students will create a floor plan on graph paper demonstrating their understanding of the concepts.

Grade/Level:

Grades 6 - 8

Duration/Length:

This lesson takes approximately 5 - 7 days.

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Calculating area
- Addition and multiplication of decimals
- Using/drawing on graph paper
- Converting units

Student Outcomes:

Students will be able to:

- use formulas to calculate area for triangles, squares, rectangles, trapezoids, and parallelograms.
- accurately measure using standard units.
- determine cost per square foot for carpet, tile, paint, and wallpaper.
- plan costs within a budget.
- share a finished product by oral presentation and written explanation.

Materials/Resources/Printed Materials:

- Geoboards
- Graph paper (included)
- Pencils
- Calculators
- Rulers
- Ads from stores such as Home Depot or Lowes (prices for flooring, paint, . . .)
- Worksheets (included)
- Rubrics (included)

Development/Procedures:

Day 1 - Pre-Activity

- Draw a square, rectangle, triangle, trapezoid, and parallelogram on the board and have students name each figure and describe characteristics of each (e.g., Square - four sides, same lengths, etc.). Discuss the meaning of area and pass out geoboards.
- Direct the activity and have students make each of the shapes and calculate the area using the geoboard.

Day 1

- Explain the overall activity that the students will be working on and pass out the rubrics to the students. Go over the expectations and explain the rubrics.
- Hand out Worksheet #1 on area.
- Do the first few examples at the top of the page with the students and then let them work on the examples at the bottom on their own.
- While students are working on the worksheet, circulate around the room and see that students understand and complete the worksheet on area.

Day 2

- Hand out Worksheet #2 on scales.
- Explain to the students that this is a sample of a possible floor plan. It is using four different shapes and there are labels in each room.
- Tell students that windows will be a standard size of 4 ft x 4 ft and doors will be a standard size of 6 ft x 3 ft. Standard wall height will be 8 ft.
- Choose one room to illustrate the process to the students. Explain that window and door areas are subtracted from total area when figuring square footage for walls.
- Have students work in pairs to calculate costs of carpet/tile and wallpaper/paint for two different rooms.
- Assess student understanding by sharing costs and calculations.

Day 3

- Hand out two sheets of graph paper to each student.
- Explain that they are to plan a first floor and second floor for their dream house.
- Explain the scale of one square = one square foot.
- Tell students to indicate where there will be windows and doors.
- Tell students that they need to use at least 4 out of the 5 shapes for their rooms and all rooms need to be labeled (e.g., living room, dining room, bedroom)
- Students should have a rough draft completed for Day 4.

Day 4

- Handout Worksheet #3 and newspaper ads.
- Have students select three choices for tile, carpet, wallpaper, and paint using the format on the worksheet.
- Explain to students that it is assumed that one can of paint will cover 400 square feet and one roll of wallpaper will cover 55 square feet.
- Students will calculate the costs of their selections and determine what will fit within their allotted budget.

- While students are working, circulate around the classroom to make sure that students are showing all of their calculations.
- Students should have a final copy of their floor plans completed for Day 5.

Day 5

- Complete Worksheet #3 if necessary.
- Have students work on Worksheet #4, which is writing a paragraph explaining why this plan is their dream house.
- Go over the details that should be included in the paragraph listed on the Worksheet.
- Students should complete all plans and explanations for oral presentations on Day 6.

Day 6

- Review the rubric for the oral presentation.
- Begin oral presentations of the dream homes.
- Students should turn in their final products, which will include all worksheets, floor plans, and paragraph.

Performance Assessment:

Student assessment will be based on the completion of the worksheets, floor plans, and the oral and written presentation using scoring rubrics in the packet. Assessments may be weighted by teacher judgment since this is a long term project.

Extension/Follow Up:

Some extension activities may include:

- Building a 3D model of the floor plans and having students wallpaper and paint the house.
- If all students make a 3D model of their homes there could be an open house where parents and peers come to view the final products.
- Students could draw designs of the exterior of their dream home, showing placement of the doors and windows in relation to their floor plans.
- Students could make a more detailed and elaborate floor plan for their homes.

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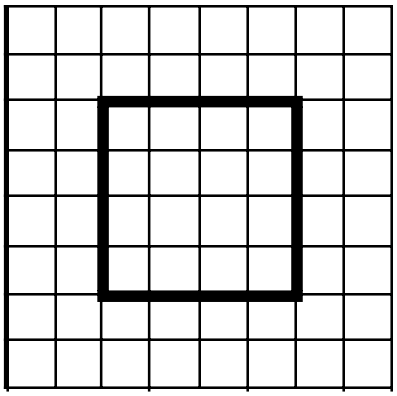
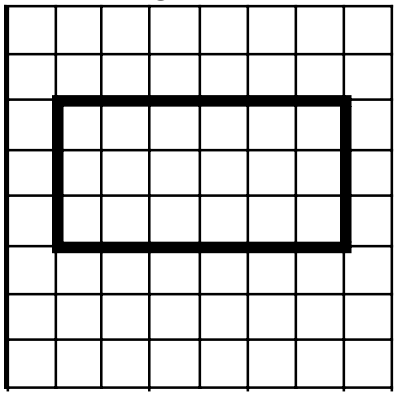
Worksheet #1 - Area

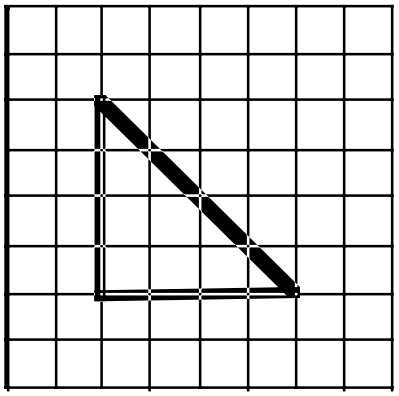
Square: A = l x w



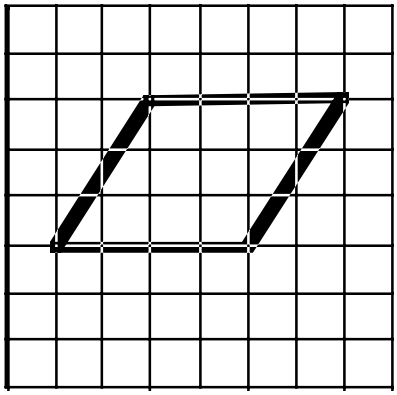
Rectangle: A = l x w



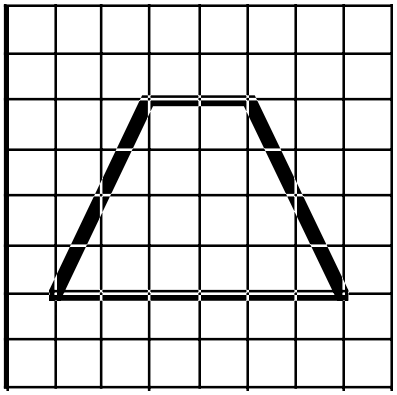
Triangle: 1/2 bh



Parallelogram: A = bh



Trapezoid: A = 1/2 (b_1 + b_2)h



Find the Area:

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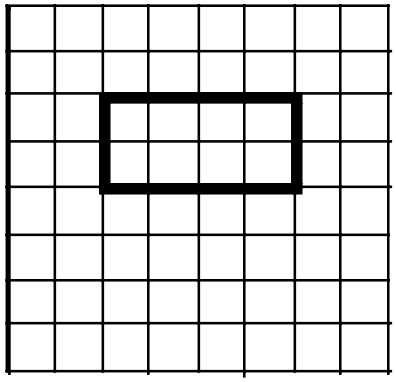

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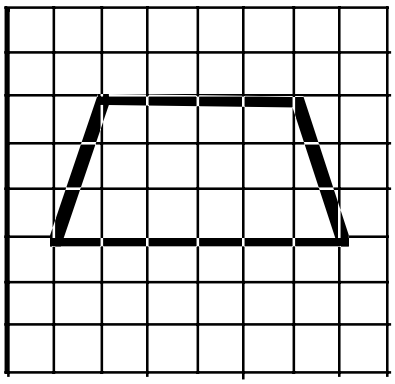

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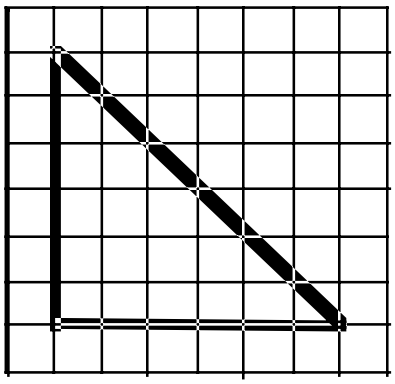

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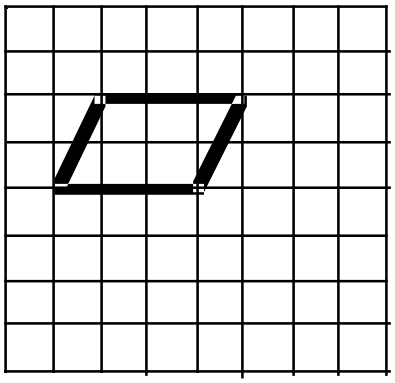

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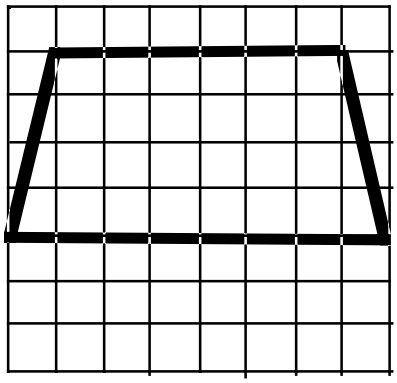
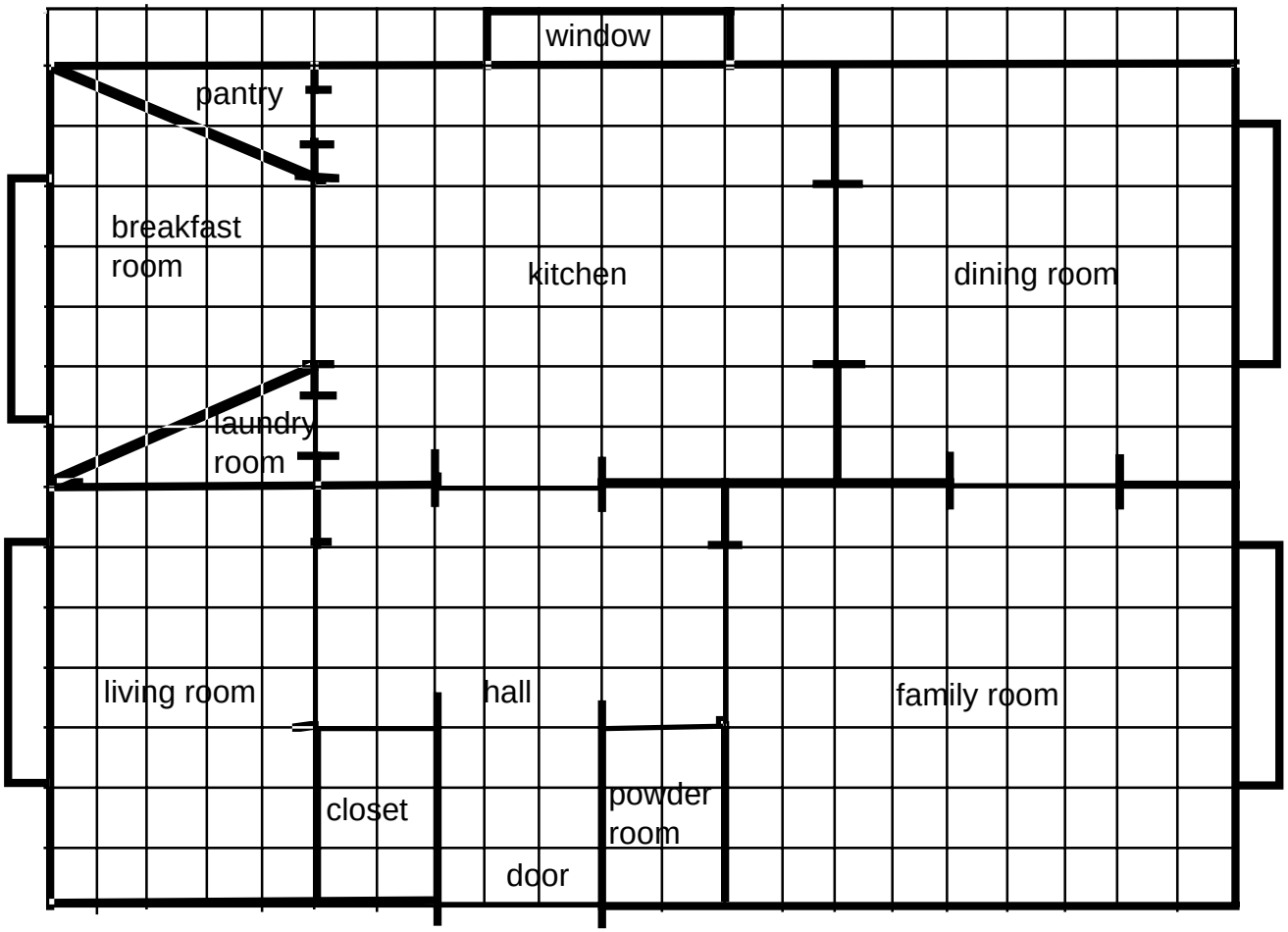


Worksheet #2



Budget- $5,000

Tile

Room size	Kind of Tile	Price $2/sq.ft.

Carpet

Room Size	Carpet Style	Price $3/sq.ft.

Wallpaper

Wall sizes	# of Rolls	Price $7/roll

1 roll covers 55 sq. ft.

Paint

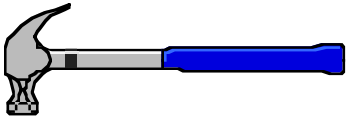
Wall size	# of Cans	Price $20/can

1 can covers 400 sq. ft.

Budget: $5,000 **Worksheet #3**

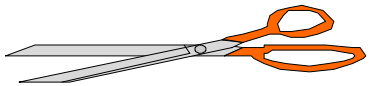
Tile:

Room & Size	Kind of Tile	Price per square foot	Sq. ft. x Price



Carpet:

Room & Size	Kind of Carpet	Price per square foot	Sq. ft. x Price



Wallpaper: (1 roll covers 55 sq. ft.)

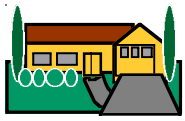
Room & Size	Number of rolls	Price per Roll	# Rolls x Price

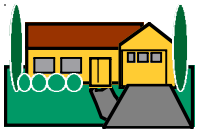
Paint: (1 can covers 400 sq. ft.)

Room & Size	Number of Cans	Price per can	# Cans x Price

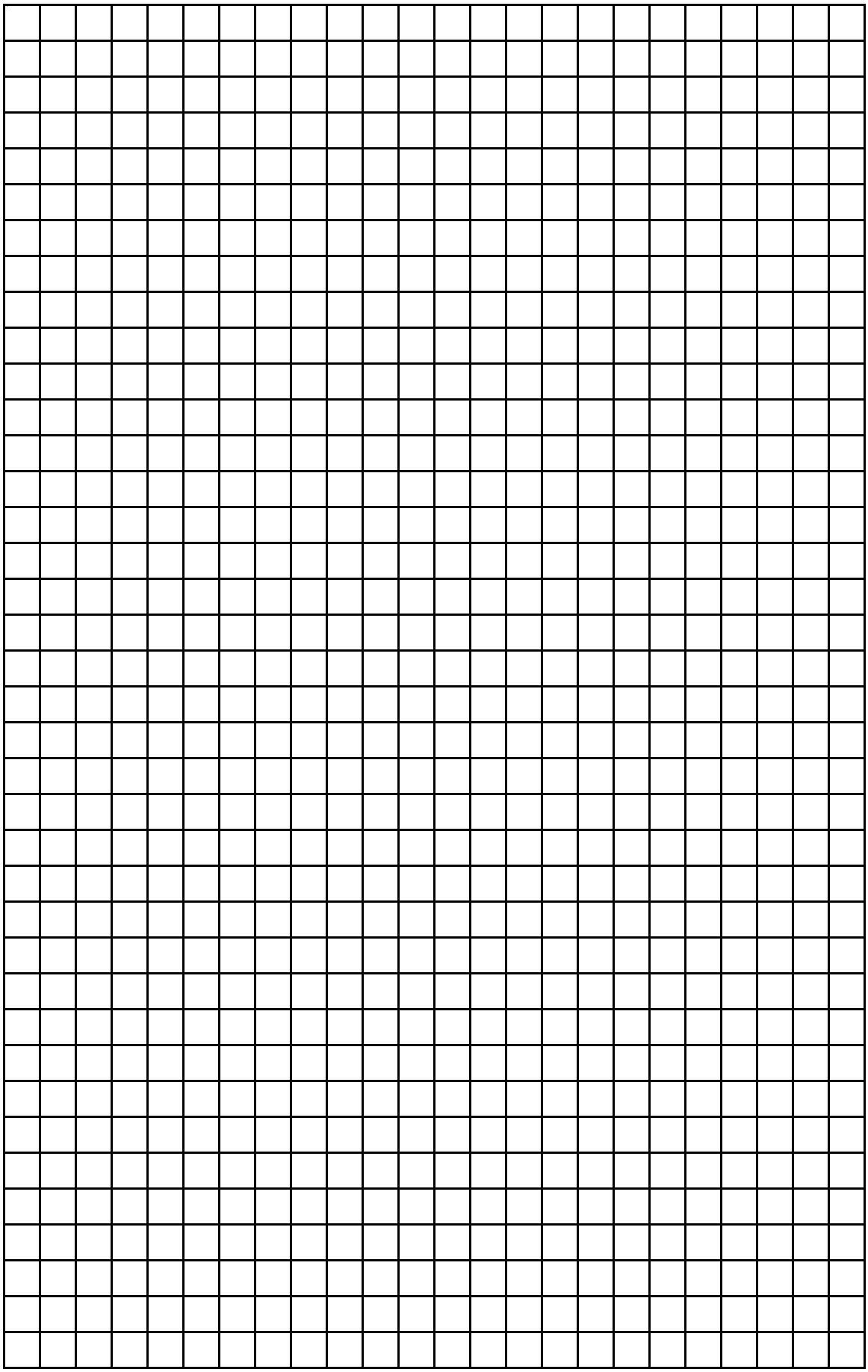
Worksheet #4

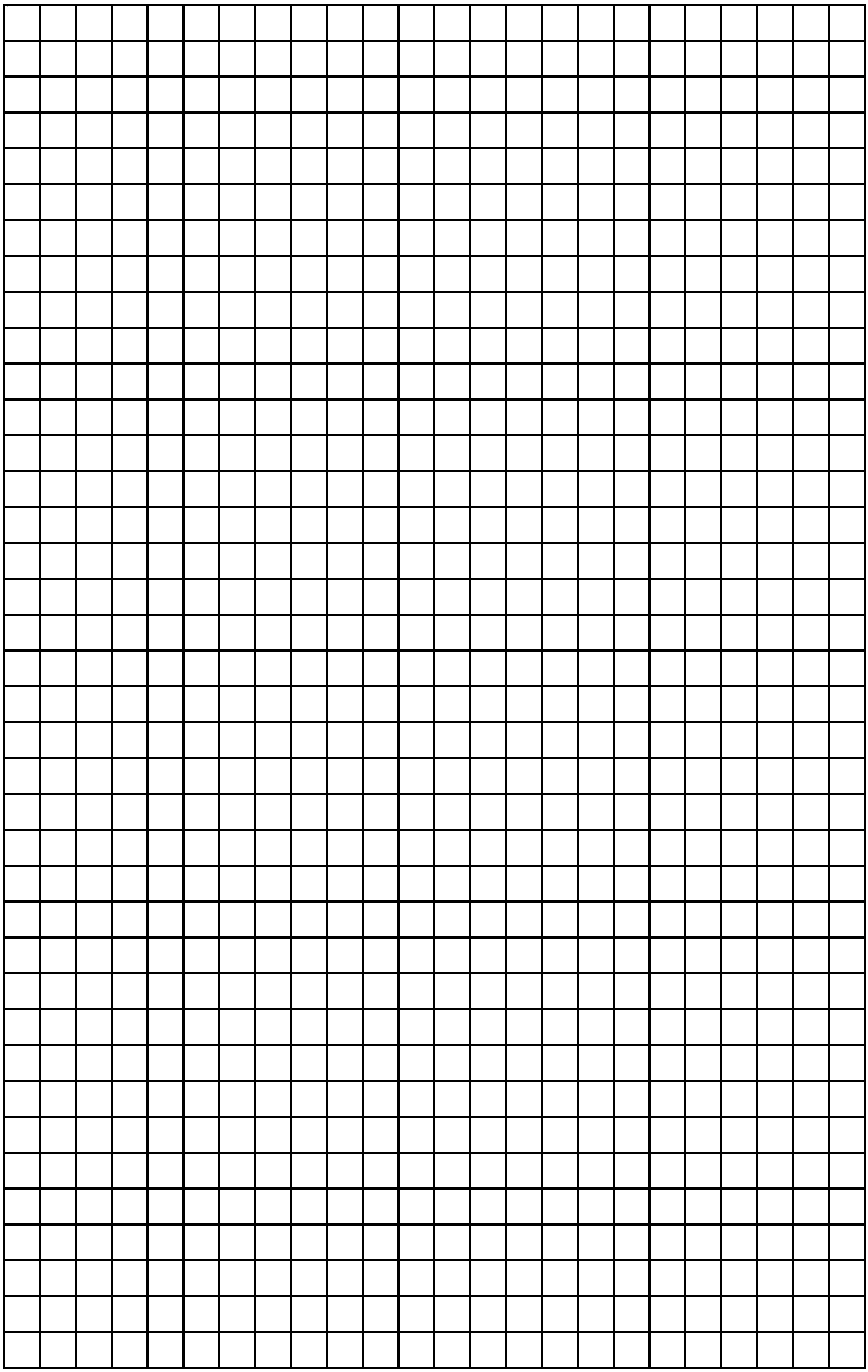
Write a paragraph below explaining why this floor plan is your dream home. Think of details such as:





- special features
- cost comparisons
- shapes of rooms
- sizes of rooms





Rubric for Dream House Project

3 Points Students will:

- Accurately complete all worksheets and exhibit understanding of material presented.
- Present two completed plans on graph paper, consisting of the first and second floors of the house.
- Show all calculations for computing area and cost/square footage.
- Use four of five shapes for rooms and areas.
- Accurately compute the cost of carpet/tile and wallpaper/paint for four of the differently shaped rooms.
- Use proper units when calculating costs.
- Keep costs within an allotted budget.
- Write a paragraph clearly explaining the reasons of why this is the student's dream house.

2 Points Students will:

- Complete all worksheets with a basic understanding of material.
- Present two plans on graph paper, consisting of the first and second floors of the house.
- Show most calculations for computing area and cost/square footage.
- Use three of five shapes for rooms and areas.
- Compute the cost of carpet/tile and wallpaper/paint with some accuracy.
- Use units with some accuracy, when calculating costs.
- Keep costs close to allotted budget.
- Write a paragraph explaining why this is the student's dream house.

1 Point

Students will:

- Complete one or two worksheets with some understanding of material.
- Present at least one plan on graph paper, consisting of the first and/or second floors of the house.
- Show minimal calculations for computing area and cost/square footage.
- Use one or two of five shapes for rooms and areas.
- Use units with minimal accuracy when calculating costs.
- Calculate the area and cost/square footage with minimal accuracy.
- Not keep costs within the allotted budget.
- Submit an incomplete paragraph about their dream house.

0 Points

Students will:

- Complete no worksheets.
- Present an incomplete plan and no calculations.
- Use only one shape for rooms and area.
- Show no evidence of units of measure.
- Show no calculations of area and cost/square footage.
- Show no consideration to the allotted budget.
- Fail to present a written paragraph explaining their dream house.

Rubric for Oral Presentation

3

- Student is prepared and knowledgeable.
- Presentation length is 5 minutes.
- Student’s explanation is clear.
- Floor plans are neatly completed and properly labeled.

2

- Student is fairly well prepared and knowledgeable.
- Presentation length is 3 - 4 minutes.
- Student’s explanation is fairly clear.
- Floor plans are fairly neat and labeled.

1

- Student is somewhat prepared.
- Explanation is not clear.
- Floor plans are not complete.

0

- Little or no attempt is given by the student to explain their knowledge and plans.